CERTAIN METASTATIC COMPLICATIONS OF GONORRHŒA*

By SIR ROBERT STANTON WOODS, M.D., F.R.C.P.

MADAM PRESIDENT, LADIES AND GENTLEMEN,—The scope of our discussion is defined as "Metastases of Gonorrhœa." I feel, however, that the limit of your patience will have been reached when I have dealt, even far from exhaustively, with the only metastasis with which I can claim acquaintance, namely, gonococcal arthritis.

Interpreting my "terms of reference" as being to present a questionnaire which shall stimulate discussion, I shall take it as a compliment if I elicit also opposition of view, for I fully realise that I am addressing experts—a title to which I lay not the slightest claim.

Recently, in taking the views of colleagues upon the frequency of occurrence of gonococcal arthritis, I have been somewhat surprised to find that this is considered to be, at present, a rare condition. It may be that my own diagnostic criteria are at fault, and this I would put forward as the first and, in some obvious respects, the most important feature for discussion.

Diagnosis.—As a clinician I am afraid that I approach the question of diagnosis by considering first the clinical picture. Especially would I lay stress upon the history. An individual in good health is suddenly attacked with generalised joint pains. Here, at the outset, one is suspicious if *unusual* joints are involved, such as the sterno-clavicular or a thyrohyoid junction. Generally there is a pyrexia of 101°—it may be 104°. After a few days, probably without treatment, the symptoms disappear entirely with the exception of a single joint, and it may be that this has been the most painful joint from the very start. At this stage the individual comes first under one's notice, and the residual wrist, tarsus, etc., is acutely painful and exquisitely tender, red and either

* Based on an address delivered before the Medical Society for the Study of Venereal Diseases, March 31st, 1935.

more or less fluid-distended without undue periarticular affection, or else shows a general infiltration of the whole of the soft structures which are available for examination, without much, if any, effusion of fluid. This residual joint may quickly become normal, but the condition is more likely to persist for a week or more, and may then either subside completely or become permanently the subject of partial incapacity from limitation of movement. The neighbouring muscles, as with any acute or subacute joint infection, undergo rapid atrophy. This, rather than any thinning of previously infiltrated periarticular tissue, is the explanation of the thinned appearance subsequently presented by, for example, a gonococcal shoulder joint.

In the very early days X-ray examination is, of course, of no assistance. The earliest change, if any occurs, is a loss of bone salts, either general in the neighbourhood of the joint or in patches giving a " pitted " appearance. This is a phenomenon common to several acute and subacute infections. Of this nature, I think, is an appearance which I have come to associate more specifically with gonococcal infection. At the margin of, for example, the upper surface of a tibial tuberosity is a notch as if made by a rat's bite. It occurs at the marginal junction of cartilage and bone, and at first sight gives the impression of an ulcer at this site. Having, however, observed the process of redeposit of bone salts, I have come to the conclusion that the other is its true explanation. In one instance I have followed this condition radiographically until it had been replaced by a marginal lip or deposit of new bone. Later there may appear a haziness or woolliness of the cartilage followed by actual erosion or ulceration of this, either in whole or locally. (Should bone be laid bare, granulations may form across the joint space and true bony ankylosis occur. This last may, of course, be a sequel of any pyogenic joint infection. Some would hold the view that ulceration of cartilage and bony ankylosis are always due to secondary infection.)

With such a clinical picture the diagnosis is moderately straightforward ; but I am confident that only a proportion, possibly a minority, of cases of what are gonococcal arthritis conform to the picture. It therefore becomes of importance to assess, in so far as is possible, the value of other diagnostic factors.

And here I confess to assuming the *rôle* of mere inquiry.

The value of the complement-fixation test is a much-debated subject. There appears to be no doubt that it is genuinely specific. Antibodies are present in the blood within two weeks of the beginning of the primary infection, and the majority of opinion seems to hold that, where the infection is present, the complement-fixation test is positive in about 80 per cent. of individuals, that this test may indeed constitute the only late means of diagnosing a gonococcal infection, and that it may be much more difficult to isolate the gonococcus in culture than to carry out a satisfactory complement-fixation test. If the test is negative it is said to be even more reliable, this, indeed, according to some, being " the most reliable means of estimating a cure." Not only on the general value of the complement-fixation test will your views, ladies and gentlemen, be of the utmost interest. I would ask expressions of opinion with regard to the following particular problem.

Not infrequently I see an instance of multiple chronic arthritis which does not conform to any recognised clinical group and which, for this reason, and not at all because it bears any real resemblance to gonococcal arthritis, I send for investigation by our L.C.C. Clinic. A certain number of these are returned by experts as either harbouring the gonococcus in the pelvis or at least showing a positive complement-fixation test. In how far can I be influenced by a positive complement-fixation test, or even by the presence of the gonococcus, in deciding whether this is ætiologically related to the joint condition or is an accidental finding? We know that there is a high incidence of gonococcal infection amongst hospital adults ; it has been placed as high as 11 per cent. Would a positive complement-fixation test in the aspirated fluid be more conclusive ? After an experience of over twenty years of dealing with multiple chronic joint disease, I confess to amazement at the number of unexpectedly positive returns obtained since adopting this experiment within comparatively recent years. A similar problem arises in the not uncommon case of an individual who presents himself with what is apparently fibrositis and who has suffered from a gleet for years.

This problem of differential diagnosis is most inadequately dealt with in the literature. As a rule the dis-

cussion centres around tubercle, monoarticular arthritis due to the various coccal organisms such as the pneumococcus, Charcot's disease, etc. There ought not, however, to be any great difficulty with alternatives such as these, or, at any rate, protracted difficulty. A similar remark applies also to rheumatoid arthritis, where this disease occurs in characteristic form, and it is only in such circumstances that the term rheumatoid arthritis ought to be employed. Where, in my own practice, the greatest, occasionally indeed an insuperable, difficulty arises is in deciding the ætiological relevance of a positive complement-fixation test, or a positive gonococcus finding in the pelvis, in an individual who is the subject of an atypical multiple chronic or subacute arthritis, a condition which one is accustomed vaguely to classify as " infective" arthritis. Only this week I have seen again a woman of fifty who has been under my care since November with arthritis of insidious onset five years ago in the right wrist and a recent exacerbation. Because of gross loss of cartilage from all the carpal and metacarpal joints I sent her to our L.C.C. Clinic, where the complement-fixation test was found to be negative, but the gonococcus was found in a cervical smear. Clinically, the joint would conform with the diagnosis of gonococcal arthritis, but, on the other hand, the history is atypical and the complement-fixation test negative.

As I have already said, this is a much more frequent association than one used to consider it to be. Probably, indeed obviously, my difficulty is due to my own ignorance, and this evening I am confidently expecting light to be thrown by the expert upon this particular problem.

Some of my audience may have experience, in this respect, of the effect of the injection of dead bacteria. I would ask them in how far does the joint reaction, following the injection of dead bacteria, establish the specificity of the arthritis ? In my own humble opinion this is one of the least reliable criteria, there being no necessary specificity in what is really a response to an injection of a foreign protein.

Before leaving the subject of diagnosis I would refer to two situations in the body which are supposed by some to be in themselves of diagnostic significance. I have heard the statement made that " Spondylitis is always gonococcal." Now it is axiomatic that the

condition in view when this erroneous pronouncement was made was the so-called " Pierre-Marie " affection of the interlaminal facets—a true infective arthritis in my opinion ; no one could refer in these terms to the longer or shorter bony projections situated anteriorly or laterally on the vertebral bodies and arising in the anterior longitudinal and lateral ligaments as a response to trauma—single, or, more frequently, prolonged and repeated trauma, as in a long life of hard work. In the seventy individuals (a paltry number) with gonococcal infection of joints whom I have been able to review as having been under my care in the past three or four years, only one has suffered from a gonococcal arthritis of the spine. I am convinced not only that this condition of infective spondylitis is not diagnostic of a gonococcal infection, but that it is generally due to some other infective cause.

The other so-called diagnostic site is on the os calcis. The causation of a spur on this bone is also by some said to be in all cases the gonococcus. I have watched radiographically the formation of such a spur in an individual who harboured the gonococcus in his prostate, and, on the balance of evidence, I came to the conclusion that the occurrences were in that instance cause and effect. That this, however, is even a common causative association I do not believe.

Pathology.—The morbid changes in and around joints which are affected by gonococcal arthritis, where the diagnosis is beyond question, are subjects of common knowledge.

Where the diagnosis is doubtful, and especially in those instances, to which I have already referred, of multiple, subacute or chronic, so-called infective arthritis, whose ætiological bacteriology is problematic, one naturally cannot express a definite opinion. And yet this, of course, being obscure is much the most interesting group. I would merely mention one or two features which rouse one's own suspicion. In association with infective polyarthritis, the pronounced tendency, sometimes seen, to affection of tendon sheaths is one of these features. Again, as a complication of such arthritis, one finds large, isolated, subcutaneous collections resembling fibro-lipomata, and running up, *e.g.*, from the head of the ulna or, less prominently, from the lower extremity

of the radius. Meeting with this, I like a special pelvic examination and a complement-fixation test. In combination again with a multiple joint affection, there is occasionally one joint or joint group which, asymmetrically, is much more diseased than the others; and especially if this happens to be located, say, in a tarsus, one begins to wonder. Finally, one knows that true rheumatoid arthritis (a rare disease) is said sometimes to result in bony ankylosis. I am, however, chary of accepting such a state of affairs until a thorough pelvic and serum examination has given negative results.

As I have said at the beginning, my aim is to stimulate discussion, and I do not, therefore, propose to deal with the comparatively hackneyed subject of the pathology of classical gonococcal metastases in joints. Before, however, passing from the subject of pathology, I should like to ask members of this learned Society whether lymphangitis has been an accompaniment, in their experience, of any non-suppurative form of this disease.

In two succeeding months of last year I saw two men with this condition: one in the right forearm accompanying a gonococcal arthritis of the carpus; and the other in first the left forearm and, after its disappearance, then in the right forearm and upper arm accompanying again gonococcal arthritis of each carpus.

All three wrists recovered fully within a month.

I would only say this regarding *Ætiology*. Of all the people who contract gonorrhœa only about 2·5 per cent., it is estimated, suffer from gonococcal arthritis. What is the explanation? It would naturally suggest itself as reason either that the tissues have been sensitised in the 2·5 per cent. and not in the remaining 97·5 per cent., or else that in the 97·5 per cent. no bacteria circulate in the blood—or both may be factors. One cannot help feeling that a much higher percentage than 2½ of the infected individuals are subjects of, at any rate, a transient bacteræmia and that, therefore, the former factor is predominant. As local trauma, by rendering tissues more liable to sensitisation, can undoubtedly play a part in determining the onset of arthritis, it would appear to be ordinary precaution that an individual with acute gonorrhœa should lead a life sheltered from exposure, knocks, etc., and that, especially with an accompanying malaise denoting the possibility of a

general infection, he or she ought to be in bed. Whether rough pelvic treatment may predispose to generalisation of the bacteria I am not competent to judge; but on common-sense grounds it appears to one that the earlier the elimination of the gonococcus is secured the better. It is also established that animals which have been sensitised to one germ may succumb, in consequence of this sensitisation, to an entirely different micro-organism (Kinsella). The lesson of this reflection is also obvious in trying to avoid gonococcal metastases.

Prognosis.—I know of no acute joint affection where, in the early stages, prognosis is more difficult. So great is the apparent tendency in some for the course to be self-limited that one is sometimes tempted to think that local joint treatment makes very little difference. This is one of the most characteristic features of gonococcal arthritis —and at times one of the most disconcerting. It is many years now since I received my first lesson to this effect and I have never forgotten it. What *may* happen to a joint I have already mentioned.

Treatment.—In a disease whose course, if untreated, is so problematic, the question of treatment is naturally a very difficult one. One writer makes the statement that " Gonococcal arthritis runs its course irrespective of joint treatment."

In a review of the literature, the treatment of acute gonococcal arthritis which one finds recommended varies between the extremes of active interference and the equally dangerous prolonged immobilisation; whilst the late stages of the disease are almost entirely ignored.

I am not competent to speak from experience of such procedure as arthrotomy and irrigation with either inactive or antiseptic fluids for every case of recent gonococcal arthritis. I would merely say that it appeals to me as being somewhat drastic in a disease which often recovers spontaneously. Less objectionable is aspiration and distension of a joint with either fluid or atmospheric air in order to keep apart adjacent layers of plastic exudate. One writer who especially recommends this illustrates by X-ray reproductions the air penetrating between these layers—a somewhat ambitious radiographic effort.

Almost our sole aim, of course, in treatment is restoration of function. Relief of pain is desirable, but secondary

in importance. Incomparably the most common cause of loss of function is change in the soft tissues—the synovial membrane, the capsule with its reinforcing ligaments and the periarticular tissues, namely, muscles, tendons, tendon sheaths and subcutaneous fat and fascia. This change is due to vascular and perivascular inflammatory response to an insult, with subsequent organisation of inflammatory exudate, and we aim at absorption, as speedily and completely as possible, of this exudate. Perhaps the most effective artificial means of promoting this end is *massage*. During the time that a joint is too tender to permit of even the lightest massage, the limb muscles above and below can be safely treated, thus at least tending to promote interchange. As soon as massage over the joint itself can be borne I do not know of any contraindication of this, and there is no other very acute arthritis in which early massage is so well tolerated as in that due to gonococcal infection. Nor do I know of another in which the results of this procedure are, at any rate, so apparently encouraging. Unfortunately it is not nearly so potent in influencing absorption of joint effusion as in promoting that of periarticular infiltration.

It must be obvious that as soon as *joint movement* is safe and tolerated by the individual it ought to be started. Most authorities prescribe immobilisation in plaster for variable periods up to two weeks or even longer. I must say that I look upon plaster of paris in general as a sometimes necessary evil. No one can deny that it is sometimes necessary, and I can conceive of even an acute gonococcal arthritis in which the pain cannot otherwise be controlled. I would almost prefer, however, to give morphine for a few days, and I cannot believe that the very slight degree of involuntary movement that, in these circumstances, occurs in a joint lying between sandbags or on a loosely applied splint can have any harmful effect upon the pathological processes in a joint such as we are considering. Indeed, it may do good. On the other hand, there is something depressingly irrevocable and final in a stone casing, to say nothing of the atrophying effect of its constant pressure on neighbouring muscles. I would therefore encourage movement at the earliest possible stage, partly for the sake of the nutrition of all the articular and periarticular tissues and partly in order to prevent adhesions. This, indeed,

constitutes, I think, the only argument in favour of distending such a joint with air, namely, that it is said to permit of movement. (Indeed, I should be less disinclined to agree with the pessimist who scoffs at all treatment in this condition if he included in his ban what is, to my mind, the negation of treatment carried to a criminal extent, namely, prolonged immobilisation in plaster of paris.)

I think that, in early stages, compared with massage and movements, other physical methods take secondary place. *Radiant heat and diathermy* are, in my experience, helpful—the former acting as a good counter-irritant, the latter supplying deep heat to the tissues ; and heat in various forms is one of the most valuable therapeutic agents we possess. Of the special use of pelvic diathermy in the treatment of gonococcal arthritis I have no experience ; but the preponderating majority of those who can speak from experience speak or write in a disappointed strain. I have a great regard for Dr. Cumberbatch, the protagonist of this therapeutic measure, and am prepared to believe that he may yet prove its value.

When we are consulted about a gonococcal joint long past the acute stage the loss of function is due either to periarticular organised exudate or to fibrous or bony ankylosis. This latter condition I do not suggest for discussion whilst the treatment of the former is straightforward, if sometimes disheartening. Here, again, however, this disease holds its surprises for us, and one of these is the response such a joint may at times show to an efficient and prolonged course of physical treatment, comprising literally the whole therapeutic armament of physical medicine. Massage, in all its forms, radiant heat, diathermy and the direct current applied to the joint, with massage and faradic stimulation of the neighbouring muscles, will sometimes literally transform an apparently hopeless joint. As in many other chronic joint conditions, however, it is waste of time to hope for results from half a dozen administrations of such treatment. One of the secrets in chronic joint disease is patience and persistence. The hospital out-patient, therefore, for whom time and money are as nothing, not infrequently shows better results than the private patient.

Short-wave.—With ultra-short-wave therapy I do not propose to deal. As some of you are aware, a general investigation into the claims made for this physical agent in treating disease as well as into its bio-physical properties is in progress at the London Hospital under the direction of two others in addition to oneself and sponsored by the Medical Research Council. Ultra-short-wave therapy is still *sub judice* in this country.

Ladies and gentlemen, I have suggested for discussion only a few outlying features of what may be one of the most crippling of disease groups. To deal with the whole of gonococcal arthritis would require a large volume, and I fear that I have been somewhat selfish in presenting for your consideration difficulties which have constituted some of my own, very many stumbling-blocks in practice.

REFERENCES

Arthritis. *Med. Clin. North America,* **14,** 1441–1451, *Journ. Missouri Med. Assoc.,* **28,** 314–318.

Polyarthritis (new-born). *Lancet,* **1,** 1349, June 20th, 1931.

Complications (Arthritis, etc.). *Amer. Jour. Surgn.,* **12,** 277–281, May, 1931.

Vaccines. *Ven. Dis. Inform.,* **12,** 1–7, June 20th, 1931.

Acute Arthritis. *Illinois Med. Journ.,* **59,** 430–432, June, 1931.

Recent Studies. *Journ. Lab. and Clin. Med.,* **15,** 1062–1065, Aug., 1930.

X-ray Therapy. *Radiology,* 691–692, Dec., 1930.

Arthritis. *U.S. Nav. Med. Bull.,* **28,** 380–382, Apr., 1930; *Amer. Journ. Med. Sci.,* **179,** 782–784, June, 1930.

Six Hundred and Ten Cases. *Sur. Gynæ. Obst.,* **49,** 105–113, July, 1929.

Management. *South Med. Journ.,* **22,** 469–472, May, 1929.

End Results, 70. *Amer. Journ. Surg.,* **5,** 241–251, Sept., 1928.

Exostosis. *Journ. Urol.,* **20,** 259–265, Aug., 1928.

Treatment by Injection of Vesicles. *Atlantic Med. Journ.,* **31,** 793–794, Aug., 1928.

Bones and Joints. *Urol. and Cutan. Review,* **31,** 444–446, July, 1927.

Infancy, 44 Cases. *Amer. Journ. Dis. Child.,* **32,** 932–948, June, 1927.

Spurs. *Brit. Journ. Ven. Dis.,* Apr., 1927.

Diathermy. *New Zealand Med. Journ.,* **33,** 96–101, Apr., 1934.

Synovial Fluid. *Journ. Clin. Invest.,* **13,** 767–776, Sept., 1934.

C.F.T. in Blood and Synov. *New Eng. Journ. Med.,* July 19th, 1934.

X-ray. *Journ. Bone and Joint Surg.,* **15,** 615–621, July, 1933.

History (Arthritis). *Brit. Journ. Ven. Dis.,* **9,** 194–201, July, 1933.

In Women. *Send. Med. Journ.,* Sept., 1933.

Management. *Amer. Journ. Surg.,* 255–261, Nov., 1933.

Electropyrexia. *Physiotherapy Review,* July–Aug., 1933.

C.F.T. in Arthritis. *Canad. Med. Assoc. Journ.*, **28,** 289–292, Mar., 1933.
Factors. *Urol. and Cutan. Review*, Apr., 1933.
Short-wave. *Dermat. Wochenschrift*, Apr., 1933.
Gonococcæmia, etc., Recovery. *Journ. Amer. Med. Assoc.*, **99,** 1684–1685, Nov. 12th, 1932.
Three Hundred and Eighty-eight Cases. *Brit. Journ. Ven. Dis.*, **8,** 79, Apr., 1932 ; 192, July, 1932.
Gonococcal Rheumatism. *Guy's Gaz.*, **46,** 54–60, Feb. 20th, 1932.
Suppurative. *Lancet*, **1,** 238–239, Jan. 30th, 1932.
Peripheral Arterial Thromboses Secondary to Arthritis. *Archives Surg.*, July, 1934.